REMARKS/ARGUMENTS

The claims are 14-23. Claim 13 has been canceled in favor of new claim 21 to improve its form; new claims 22-23 have been added containing subject matter from claims 15 and 18, respectively. Claims 14-18 and 20, which previously depended on claim 13, have been amended to depend on new claim 21, and claim 19 has been amended to depend on claim 17. These claims have also been amended to improve their form. Reconsideration of this patent application is expressly requested.

Claims 13-20 were objected to as failing to conform with U.S. practice. In response, Applicant has canceled claim 13 in favor of new claim 21; has added new claims 22-23 containing subject matter from claims 15 and 18, respectively, and has amended 14-20 to improve their form. It is respectfully submitted that the foregoing amendments overcome the Examiner's objection on the basis of these informalities, and Applicant respectfully requests that the objection on this basis be withdrawn.

Claims 13-18 and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Masumura et al., U.S. Patent No. 5,366,302* in view of *Leys et al., "U.S. Patent No. 3,735,702"* (presumably U.S. patent No. 5,806,996). The remaining claim 19 was rejected under 35 U.S.C. §103(a) as being unpatentable over *Masumura et al.*, and *Leys et al.*, and in further view of *Ehrhardt, U.S. Patent No. 5,978,004.*

Essentially, the Examiner's position was that *Masamura et al.* discloses the device recited in the claims, except for a control system that controls the movement of the thermal print head; that *Leys et al.* teaches this feature, and that it would have been obvious to one of ordinary skill in the art to modify the device of *Masumura et al.* by providing a controller for controlling the movement of the print head as taught by *Leys et al.* in order to optimize print quality through adjustment of the thermal print head. *Ehrhardt* was cited with respect to claim 19 as teaching a thermal print head which has a piezo-actuator.

This rejection is respectfully traversed.

As set forth in new claim 21, Applicant's invention provides a device for printing at least one object moving at a supply speed in a feed direction. The device includes a thermal print head, means for supplying at least one object to be printed to the thermal print head, a drive for moving the thermal print head parallel or counter to the feed direction of the at least one object to be printed, and a control system for controlling the drive so that during movement of the thermal print head parallel to the feed direction of the at least one object, the thermal print head has a speed less than or equal to the supply speed of the at least one object being moved, and during movement of the thermal print head counter to the feed direction of the at least one object, the thermal print head is moved a distance away from the at least one object. In this way, Applicant's invention provides a device for printing offering a high printing capacity or labeling capacity without diminution of the print quality and/or increased wear of the thermal strip.

None of the cited references discloses or suggests a device for printing at least one object moving at a supply speed in a feed direction having the structure recited in new claim 21, or teaches the benefits of a control system for controlling the

drive so that during movement of the thermal print head parallel to the feed direction of the object or objects, the thermal print head has a speed less than or equal to the supply speed of the object or objects being moved and during movement of the thermal print head counter to the feed direction of the object or objects, the thermal print head is moved a distance away from the object or objects.

The primary reference to *Masumura et al.* relates to a thermal printer and an arrangement for replacement for the thermal head which requires frequent replacement after relatively short periods of use. *Masumura et al.* discloses a thermal printer comprising a head-mounting bracket (10) carrying a thermal print head (11), a head holder (2) for detachably holding the head-mounting bracket therein, and a pivotal head support assembly (1) for supporting the head holder (2) containing the head mounting bracket at a stationary position relative to a platen roller (P), and for pivotal movement for turning it away from the platen roller.

As the head mounting bracket (10) carrying the thermal print head (11) is detachably installed in the head holder which in

turn is supported by the pivotal head support assembly (1), replacement of the thermal print head (11) can be carried out by dismounting and re-mounting of the head mounting bracket (10) onto the head holder (2), without fastening it directly in the mainframe of the printer by means of mounting screws.

Although the Examiner has taken the position that *Masumura et al.'s* thermal print head supported on the head mounting bracket (10) can be moved parallel to the feed direction or opposite to the feed direction of a sheet of paper via a slot (4), a spring-loaded pin (6) and a crank mechanism (13-18), it is respectfully submitted that the Examiner is incorrect. The ends of the main portion (10a) of the head-mounting bracket (10) of *Masumura et al.* have downward-folded portions forming end plates (10f), each having a U-shaped notch (10g) therein. In the operating position, the thermal print head (11) is biased by springs (8) against the platen roller (P). The notches (10g) of the head-mounting bracket (10) engage the shaft (P1) of the platen roller (P) thus to <u>prohibit</u> forward and backward movement of the head mounting bracket (10). (See FIGS. 1 and 2 and column 3, lines 50-61 of *Masumura et al.)*

Thus, *Masumura et al.* teaches to prohibit forward and backward movement of the head-mounting bracket (10) of the thermal print head (11) supported thereon during the operation of the print head. Accordingly, *Masumura et al.* fails to disclose or suggest a drive for moving the thermal print head parallel or counter to the feed direction of the at least one object to be printed, and a control system for controlling the drive as recited in Applicant's new claim 21.

The defects and deficiencies of the primary reference in *Masumura et al.* are in no way remedied by the secondary references to *Leys, et al.* and *Ehrhardt*. *Leys et al.* discloses a thermal printer with a thermal head (17), including an array of juxtaposed heating elements for line-wise heating of a sheet to produce an image, and a rotatable printing drum (15) for conveying the sheet past the thermal head (17) while the thermal head is biased towards the printing drum, which is provided with a rotatable cam (46), and a reference surface (51) for adjusting the position of the thermal head with respect to the printing drum.

Leys et al. relates to so-called "banding," i.e. a defect which impairs the image quality of thermal printers. (See column 1, line 62 - column 2, line 29 of *Leys et al.*) Thus, *Leys et al.* aims to provide a thermal printer which allows the production of thermal images with much less banding than with known printers and without the need for using print drums and thermal heads with very narrow production tolerances.

The thermal head (17) of the printer taught by *Leys et al.* is mounted in a sub-frame (36), which is mounted in a lid (13) for pivoting about a stationary shaft (37). The sub-frame fits on this shaft (37) by means of an elongated bore (38), allowing the adjustment of the position of the thermal head with respect to the printing drum in the direction of arrow (39). Moreover, the vertical position of the thermal head (17) is controlled by a rotatable cam (42) engaging legs (43) of the sub-frame in *Leys et al.*

Although the Examiner has taken the position that *Leys et al.* teaches a device for printing on a sheet (24) having a controller (34) which controls the movement of the print head positions, it is respectfully submitted that the Examiner is

incorrect. In fact, *Leys et al.* teaches that block (34) includes electronic circuitry for controlling the sheet movements, the printing head positions, and the dye ribbon transport. Presumably, the rotatable cam (42) for controlling the vertical position of the thermal head is controlled by this electronic circuitry (34); however, from the detailed description of the drawings of *Leys et al.*, it is clear that the rotatable cam (46) allowing the adjustment in the direction of arrow (39) is not controlled by the electronic circuitry (34). (See column 3, line 56 - column 6, line 47 of *Leys et al.*)

FIG. 9 of *Leys et al.* is a perspective view of the adjustment mechanism of FIG. 6 (see column 3, lines 52-53). The adjustment mechanism shown in FIGS. 6-9 is a manually operated cam mechanism (see column 6, lines 41-43). As is expressly stated in *Leys et al.*: *"Adjustment occurs by pulling out the cam mechanism, changing its angular position, and re-inserting its shaft in the bore of the sub-frame."*

When for a given thermal head a cam position has been found that yields optimum results with respect to a given printing drum, then this cam position and thus the position of the thermal

head with respect to the printing drum would not be changed. (See column 6, lines 14-21 of *Leys et al.*) As expressly stated in *Leys et al.*: *"The adjustment which yields optimum results is in practice found on the basis of series of tests during which the adjustment of the thermal head is changed from the most rearward to the most forward position. The setting of the cam position which yields optimum results can then be marked on the head so that the head, as it has been removed for servicing of the apparatus, for remedying a paper jam, etc., can be replaced in exactly the same position."*

Therefore, it is respectfully submitted that *Leys et al.* teaches designing this adjustment mechanism as a manually-operated cam mechanism; however, there is no disclosure or suggestion in *Leys et al.* of a controller for controlling a drive for moving the thermal print head parallel to or counter to the feed direction of a sheet or an object to be printed as recited in Applicant's new claim 21.

The remaining reference to *Ehrhardt* cited by the Examiner with respect to claim 19 has been considered, but is believed to be no more relevant. *Ehrhardt* simply discloses a label printer

with a label-edge sensor that includes a thermal print head (7), a pressure transducer (11) disposed at a junction between a pivoted support bracket and the thermal print head (7). The pressure transducer (11) serves as a motion sensor and may be in the nature of a piezo stack (25). There is no disclosure or suggestion, however, of a device for printing at least one object moving at a supply speed in a feed direction having a control system for controlling a drive for moving a thermal print head parallel to or counter to the feed direction of an object or objects to be printed, so that during movement of the thermal print head parallel to the feed direction of the object or objects, the thermal print head has a speed less than or equal to the supply speed of the object or objects being moved, and during movement of the thermal print head counter to the feed direction of the object or objects, the thermal print head is moved a distance away from the object or objects.

Thus, even if one were to make the hypothetical combination suggested by the Examiner, one would still not achieve Applicant's device for printing at least one object as recited in new claim 21. Accordingly, it is respectfully submitted that new claim 21, together with claims 14-20 and 22-23 which depend

directly or indirectly on new claim 21, are patentable over the cited references.

In summary, claims 14-20 have been amended; claim 13 has been canceled, and new claims 21-23 have been added. In view of the foregoing, it is respectfully requested that the claims be allowed and that this case be passed to issue.

Respectfully submitted,
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